

Introduction

1.1 Background of the Problem

The rapid growth of e-commerce has transformed traditional business models, creating new opportunities for businesses and consumers. One major innovation is online bidding platforms, which enable real-time competitive bidding and facilitate transactions across regions. These platforms are now vital in industries like retail, automotive, real estate, and collectibles. The global online bidding market is projected to reach \$68 billion by 2025 [1], highlighting its growing importance.

Although online bidding isn't new, advancements in cloud computing, and mobile apps, and intelligent chatbot assistance have boosted its popularity. However, significant challenges remain, including delays in bid updates, limited scalability, and insufficient user support. These issues can frustrate users, reduce participation, and erode trust, emphasizing the need for innovative solutions to improve user experience.

A common problem in social media-based auctions, like those on Instagram and Facebook, is the lack of real-time bid updates. Bids may not appear immediately, leading to confusion and missed opportunities. These platforms often rely on manual methods, such as checking comments or messages, which are inefficient for larger audiences or more dynamic auctions.

Another issue is the limited customer support on some bidding platforms when it comes to obtaining product-related information, such as average market prices and other relevant details. Many platforms rely on outdated support channels like emails or phone calls, which can be slow and inefficient in providing real-time, accurate information. This lack of quick, reliable assistance leaves users frustrated and diminishes their overall experience with the platform. Improving access to real-time product information is essential for enhancing user satisfaction and trust.

1.2 Research Objectives

The objective of this study is to develop a bidding application that overcomes the limitations of current online bidding platforms by integrating Firebase for scalable and real-time

data storage, and Gemini AI's pre-trained chatbot model to provide personalized user assistance. The integration of these technologies aims to create a seamless, responsive, and user-friendly online bidding platform that improves the synchronization of bids and enhances the overall user experience through interactive chatbot features.

Firebase, a cloud-based platform for building and managing mobile applications, provides a scalable solution for real-time data storage and synchronization. By leveraging Firebase, the application can efficiently handle large volumes of data and scale with the growing needs of the platform. Additionally, the use of Gemini AI's pre-trained chatbot model aims to offer automated, intelligent user support throughout the auction process, answering queries and ensuring that users are informed and engaged at all times.

The goal of this research is to explore the potential of these technologies when integrated into a cohesive system and to demonstrate how their combined capabilities can enhance the online bidding experience. By addressing the current shortcomings of bid synchronization, scalability, and personalized support, this research aims to create a platform that not only meets the demands of modern users but also provides a foundation for future innovations in online auction systems.

1.3 Problem Statement

The main issues addressed in this study are the inefficiencies of current online bidding platforms, particularly in terms of bid synchronization, scalability, and the lack of intelligent support for users to obtain general information about products. Many platforms on Instagram and Facebook experience delays in updating bids, which can lead to outdated information and poor user experience.

Another major problem is the lack of personalized support during auctions. Most platforms still rely on traditional customer service methods like phone calls, emails, or web chat agents, which might not be fast enough to handle a high volume of inquiries. For instance, Ibid uses human chat agents instead of AI-powered support, JBA, which focuses on automotive auctions, offers customer service through WhatsApp, and Lelang Indonesia only operates as a website with basic support options like phone, WhatsApp, web chat agents, and email. This lack of quick, personalized support can lead to users feeling neglected or frustrated.

To address these issues, this research aims to introduce AI-powered chatbots that can provide instant, personalized assistance, improving user experience. The proposed solution combines Firebase and AI-driven chatbots to not only synchronize bids in real-time but also offer scalable data management and automated user support.

1.4 Scope and Delimitation of the Research

This research is focused on the development of a online bidding platform using Firebase, and Gemini AI's chatbot model. The scope is limited to the implementation of these technologies in an Android-based mobile application, with a primary focus on enhancing bid synchronization, scalability, and user support.

The research will not cover other aspects of auction platforms such as payment processing, inventory management, or detailed security measures, although these may be considered for future developments. The study will focus on the user experience during the bidding process, specifically looking at how AI-driven support can improve engagement and satisfaction.

Additionally, while the platform will be designed for use in Indonesia, the findings and conclusions of the study will be applicable to broader online bidding platforms globally, offering insights that can benefit auction systems in various industries.

1.5 Research Methodology

This research involves the development and evaluation of an online auction platform through a structured and iterative process. The system is built using Kotlin for Android development, Firebase for real-time data handling, and the Gemini AI chatbot to support automated user interaction. The platform is tested through a series of simulated auction scenarios to examine bid synchronization, chatbot functionality, and system performance under various conditions.

The evaluation focuses on assessing system functionality, stability, and responsiveness during testing. Observations are made based on predefined test cases covering functional, UI/UX, integration, and compatibility aspects. The role of the AI chatbot is analyzed based on its ability to process queries, deliver relevant responses, and maintain communication without errors.

The platform's effectiveness is measured through test results and technical validation. Key indicators include successful feature execution, system behavior under real-time operations, and chatbot response accuracy. This approach ensures that the system meets its functional requirements and is reliable for real-world usage.

1.6 Research Contribution

This research makes an important contribution to online bidding systems by combining real-time bidding process and smart assistant in ways that have not been fully explored before. While past studies have looked at the individual benefits of technologies like Firebase [6], and AI chatbots [7], their combined use in online auctions has rarely been studied.

This study focuses on how these technologies can work together to improve the auction experience, offering a fresh approach that can be applied to various online marketplaces. The findings aim to help create auction platforms that are more efficient, responsive, and easy to use, which could be highly beneficial for e-commerce businesses.